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(54) Data connector

(57) An electrical data connector includes a terminal support housing (4) carrying a plurality of electrical terminals (30). The housing (4) has at least one cable exit and a cable clamp (10) fixable to the housing (4), in the cable exit. The cable clamp (10) can be positioned in a plurality of orientations to provide a plurality of cable exit directions.

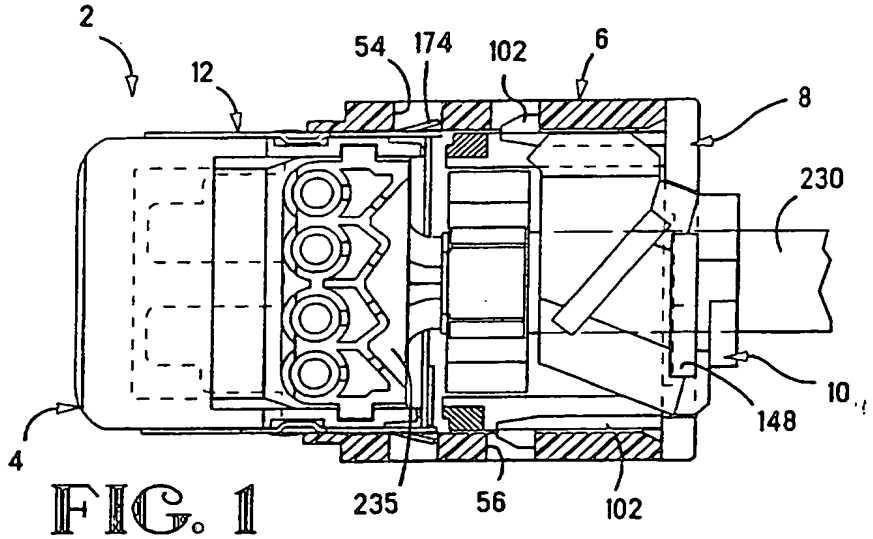

FIG. 1

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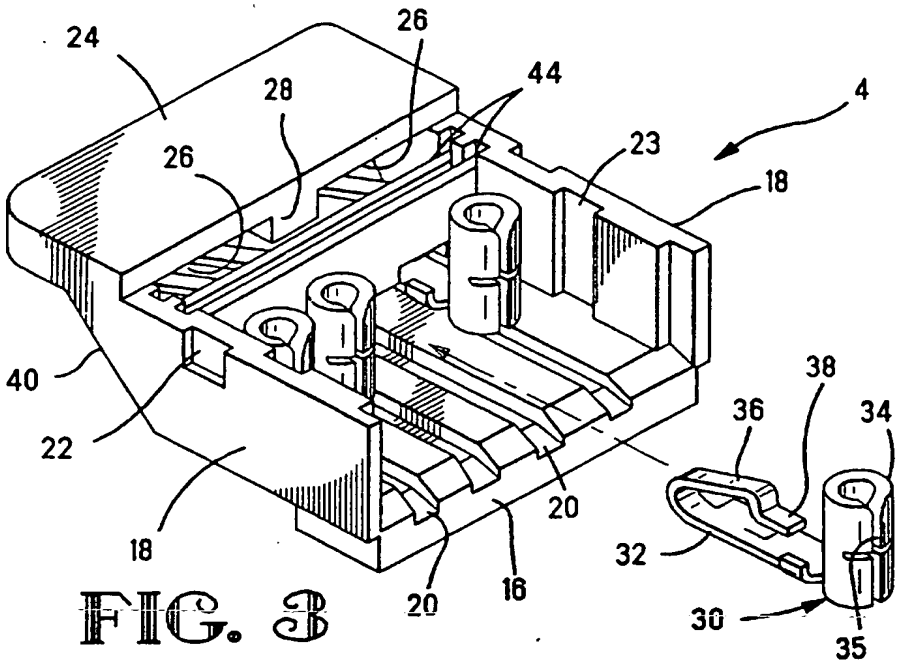


FIG. 3

Descripti n

The present invention relates to a data connector for use in local area network connections.

US-A-4 501 459 discloses a local area network connector specifically for use in the data communications industry. These connectors can be employed in a closed loop data communications link in which various equipment such as computer terminals can be interconnected in a system. These connectors are specifically adapted for use in interconnecting numerous micro or mini computers in a micro computer network in an office environment. Connectors of this type have standard interface dimensions and configurations. These connectors must also be shielded to prevent the spurious electrical signals and noise from affecting the signals in the network. These connectors also require a shunting capability since the conductors are part of a network and can be connected in series with other similar connectors. This shunting capability is necessary to prevent disruption of a network when an individual plug is not connected to external equipment.

The structure and components of local area network connectors of this type is represented by the structure of the connectors shown in the before mentioned US-A-4 501 459. These connectors include a plurality of spring metal terminals having insulation displacement wire barrels for establishing electrical connection with the individual conductors forming the multi-conductor shielded cable. Terminals are positioned on a support housing and upper and lower shields can be positioned in surrounding relationship to the terminals and the support housing. Shield members are permanently attached to upper and lower cover members and the cover members are mated to both encapsulate the conductor and to cover the upper and lower shields to the cable shielding.

There exists within the industry a need for a low cost local area network connector of this general type which can be easily hand assembled at the end user's facility. One such design is shown in WO-A-88/04841 and has an inner insulative terminal retaining housing having upper and lower shields surrounding the housing where the shielded sub-assembly is insertable into a premoulded outer boot housing. The boot housing contains latching structure for mateable interocnnection with a like connector in the data link. While the above mentioned PCT publication itself provides an enhanced low cost data connector assembly, this design also is not suitable for all data connection needs.

For instance, it is typical that the cable should have the possibility of exiting the electrical connector along a longitudinal line, straight out from the connector. The cable should also have the possibility of exiting at an angle, in applications where the cable drops to the floor or, where the connector is otherwise in a small clearance application.

An object of the present invention is to provide a low cost shielded data connector where the assembly includes the possibility of various cable exit angles, and in particular, where the alternate angled position does not require a redundancy of connector parts.

An electrical data connector for electrical connection to data cable, comprises according to the present invention a plurality of electrical terminals positioned in the insulating housing, where the housing has at least one cable exit opening therethrough and a cable support sleeve fixable to the housing for retaining the data cable. The connector is characterized in that the cable support sleeve can be fixed in the cable exit opening in a plurality of orientations thereby providing a plurality of cable exiting directions.

There is described and claimed in EP-A-558 250 from which the present application has been divided, an electrical data connector for electrical connection to a data cable comprising an inner terminal support housing having a plurality of side by side terminals disposed therein, said inner terminal support housing having an outer insulating housing at least partially surrounding therewith, said connector being characterized in that said outer insulating housing has a rear opening at least as large as said inner terminal support housing for receiving said terminal support housing therein, and a cable support assembly slidable over said data cable and slidable relative to said outer insulative housing and snap latchable thereto to support said cable.

Embodiments of the present invention will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 is an upper plan view of a connector according to one embodiment, shown partially in section;

Figure 2 is a view similar to that of Figure 1 showing the data cable exiting through the rear of the connector at an angle;

Figure 3 is an isometric view of the inner terminal support housing showing one of the terminals exploded away from the terminal support housing;

Figure 4 is an isometric view of the terminal support housing of Figure 3 in a rotated sense;

Figure 5 is an isometric view of the outer insulative housing;

Figure 6 is a plan view of the rear support plate in a preassembled position;

Figure 7 is a view similar to that of Figure 6 showing the rear support plate in an assembled condition;

Figure 8 is a rear plan view of the rear support plate shown in Figure 7;

Figure 9 is a side plan view of the support plate shown in Figure 8;

Figure 10 is an inner plan view of the cable strain relief member prior to the assembly thereof;

Figure 11 is a front plan view of the cable support member of Figure 10 shown in the folded over and assembled position;

Figure 12 is an outer plan view of the cable support member shown in Figure 11;

Figure 13 is a rear plan view of the assembled cable support member of Figures 11 and 12;

Figure 14 is an upper plan view of a lower shield member;

Figure 15 is a side plan view of the shield member of Figure 14;

Figure 16 is a rear plan view of the lower shield member of Figure 14;

Figure 17 is a top plan view of an upper shield member;

Figure 18 is a side plan view of the upper shield member shown in Figure 17;

Figure 19 is a rear plan view of the upper shield member shown in Figure 17;

Figure 20 is a top plan view of the upper and lower shield in an assembled position to the housing of Figure 3 or 4;

Figure 21 is a side plan view of the assembly shown in Figure 20;

Figure 22 is a rear plan view of the assembly of Figures 20 and 21;

Figure 23 is an upper plan view of the inner terminal support platform showing the insulated wires positioned in their terminated position; and

Figures 24 and 25 show a second embodiment of the data connector showing two angles of cable exit;

Figure 26 shows a front plan view of a rear support plate third embodiment;

Figure 27 shows a side view of the plate shown in Figure 26;

Figure 28 shows a rear view of the support plate of Figure 26;

Figure 29 shows an end view of the plate of Figure 26;

Figure 30 shows an inner plan view of a cable support member for use with the rear support plate of Figure 26-29;

Figure 31 shows an end view of the cable support member of Figure 30;

Figure 32 shows an end view of the cable support member of Figure 30;

Figure 33 shows an outer plan view of the cable support member of Figure 30;

Figures 34 and 35 show the various cable exiting positions useable with the rear support plate and cable sleeve of Figures 26-33;

Figures 36, 37 and 38 show yet another embodiment of cable support clamp; and

Figures 39 and 40 show preassembly and fully assembled positions with a complementary cable support members.

With reference first to Figure 1, an electrical shielded data connector is shown generally at 2 and comprises an inner terminal support housing 4, an outer insulative housing 6, a rear support plate 8, a rear cable support sleeve 10 and a shield assembly shown generally as 12 to encompass the outer periphery of the inner terminal support housing 4.

With reference now to Figure 3, the inner housing 4 is shown as comprising a terminal support platform portion 16 having upstanding side walls 18 where the terminal support platform 16 includes a plurality of terminal receiving slots shown generally at 20 and where the outer surfaces of the side walls 18 include notched portions shown generally at 22. A hood portion is shown generally at 24 spanning and interconnecting the two side walls 18 where the lower surface 26 of the hood portion 24 is interrupted by a longitudinally extending rib shown generally at 28 (Figures 3 and 4). Terminals are shown generally at 30 as comprising a base portion 32 having a wire barrel portion 34 extending from one end thereof and a contact portion 36 extending from the opposite end of the base portion 32, where the contact portion 36 has a stepped portion extending from the free end thereof and shown generally at 38.

The terminal 30 is slidably receivable into a respective terminal receiving slot 20 as shown in Figure 3 to a position where the contact portions 36 are adjacent to a front mating edge 40 of the terminal support housing 4, and positioned for mating interconnection with a complementary connector. The terminal support housing further includes two shunt bars 44 which span the electrical terminals 30 and selectively contact the stepped portions 38 of alternate terminals to provide a closed loop electrical connection as is more fully disclosed in U.S. Patent 4,501,459. As shown in Figure 4, the terminal support housing 4 further includes a lower insulative block portion 46 positioned on a lower surface 48 of the terminal support housing.

With respect now to Figure 5, the outer insulative housing is shown at 6 and will described in greater detail herein. The housing 6 is comprised of a central body portion shown generally at 50 which in the preferred embodiment is rectangular in longitudinal cross-section to comprise side walls 52 containing a forward and rearward window or opening 54, 56 respectively, extending through the side wall 52 on each side thereof. The housing 6 further includes upper and lower latching arms 58 and 60 which in the preferred embodiment of the connector are integrally connected to upper and lower surfaces 62, 64 respectively via integral webs of plastic material. The latching arms 58 and 60 include the standardized latching features commonly referred to as a T-bar such as 66 and a T-slot 68 whereby latching members 66 and 68 are hermaphroditically interconnectable with a like connector in the data link. As shown in Figure 5, the housing 6 further includes an inner rib 70 spanning across an inner surface 74 of the outer housing 6.

With respect now to Figures 6 to 9 the rear support plate 8 will be described in greater detail. The rear support plate 8 includes two support halves 75 and 76 where the halves are integrally moulded to one another via a central web of material shown at 78. As shown in Figures 6 and 8, the support plate includes two plate

portions 80 and 82, which are U-shaped, whereby the U-shaped members can be rotated relative to one another to form an oval shaped opening generally at 85 (Figure 8) formed by the aligned U-shaped plate members, where surface 86 abuts surface 87, and where surface 88 abuts surface 90 as shown in Figures 6 and 8. In the preferred embodiment of the invention, surface 88 includes a pin receiving aperture 92 whereas the surface 90 includes a pin 94 for alignment within the aperture 92 when the two plate halves are in the position shown in Figure 8.

Two support bars 96 (Figure 9) extend from an inner surface 98 and a front leg portion 100 interconnects the two support members 96 on each side thereof as shown in Figure 9. Each support half 75 and 76 further includes a latching member 102 also extending from the inner surface 98 and includes a lead-in surface 104 and a lead-in locking shoulder 106, as shown in Figure 7. Two recessed horizontal edges are shown at 108 and 110 in Figure 8 also formed by the cooperating plate members 75 and 76. Two plate members 112 and 114 also extend from the inner surface 98 formed by the two plate members 75 and 76 and surround the oval shaped opening at 85. The generally oval shaped opening 85 is shown in Figures 7 and 8 as having one angled surface shown best at 115 (Figure 7) whereas the other surface 116 extends along a longitudinal arcuate path, as shown in Figures 7 and 8.

With respect now to Figures 10 - 13, the cable support sleeve 10 is described in greater detail. The cable support member 10 is bipartite comprised of two halves shown at 120 and 122 in Figure 10 where the two halves are integrally moulded via a central longitudinal web of material 124. The cable support sleeve halves 120 and 122 include surfaces 126 and 128, and 130 and 132 which cooperate to form abutting surfaces as shown in Figures 11 or 13. As shown in Figures 10 and 13, the cable support halves 120 and 122 include inner beveled surfaces 135 and 136 and generally semi-cylindrical surfaces 137 and 138 where the semi cylindrical surfaces contain collapsible membranes shown generally at 140 in Figures 10 and 13. The cable support sleeve halves 120 and 122 further include side locating ribs shown generally at 142 which are spaced apart and parallel to form an inner space 143 therebetween. As shown in Figure 12, the ribs 142 include locating surfaces 144,145 and 146. As shown best in Figure 12, the cable support sleeve halves 120 and 122 also include moulded slots 148 and 150 which will be described in greater detail herein.

With respect now to Figure 14, the shield assembly 12 shown in Figure 1 is comprised in part by a lower shield member 160 having a lower shield plate 162 and side plates 164. The lower plate 162 includes a stepped portion at 166 thereby forming a shield member for surrounding the lower insulative block 46 (shown in Figure 3) and includes two forward shielding wings 168 extending forwardly therefrom. Each side plate 164 includes an outwardly projecting dimple 170, an inwardly directed alignment deformation 172, rear locking lances 174, upstanding locking tabs 176 and stamped slot 178. As shown best in Figure 16, a rear plate portion 180 is formed upwardly from the lower plate portion 162 and includes an integral cable receiving clamp 182 which is connected to the plate portion 180 via a stamped strapped portion 184.

As shown in Figures 17-19, an upper shield member is shown at 185 as comprising an upper plate portion 186, having tabs 187 extending outwardly from each side edge, and tabs 188 extending downwardly therefrom. Two shielding wings 189 extend forwardly from the upper plate 186, and as best shown in Figure 17, the wings 189 extend at a slight angle relative to the rear plate 186, as shown in Figure 18. The shield member 185 is also shown as including a rear plate portion 190, having a U-shaped opening at 191, formed by a curved shroud portion at 192. As shown in Figure 18, the upper plate portion 186 is positioned at a slight angle relative to the rear plate portion 190. Two tabs 193 extend forward from the rear plate portion 190, and too, will be described in greater detail herein.

With respect now to Figure 23 a stuffer cap is shown generally at 200 as including an integral block of plastic having cylindrical plastic barrel portions 202 profiled to overlap the outer barrel portion 34 of the terminals 30 (shown in Figure 3) and includes an inner peg portion 204 positioned part way down from an upper surface of the stuffer cap and co-axially aligned with barrel portion 202. Each cylindrical portion 202 includes a rear wire exiting slot 208 formed through the plastic barrel portion 202 to allow the wire to be inserted therethrough and positioned against the free end of the peg 204. In the preferred embodiment of the invention, the stuffer cap further includes rear plate portions 210, 212, 214 and 216 where each of the plate portions 210-216 includes a wire receiving slot similar in nature to the slots 208, the slots being shown as 218 - 224. It should be appreciated that each of the plate portions 210-216 are generally directed towards a central longitudinal axis. Stuffer cap 200 further includes aligning ribs 225 positioned on each side thereof which are profiled for receipt within the slots 23 on the inner side walls 18 of the housing 4 shown in Figure 3.

With the individual components as above described, the assembly of the cable assembly including a shielded cable such as 230 shown in Figure 1 will now be described. A shielded cable 230 generally includes an outer insulation surrounding an inner shielding braid where the shielding braid surrounds twisted pairs of data conductors, as shown in Figure 1. A crimping clamp 240, shown in Figure 2, is slid over the end of the data cable 230. The crimping clamp is similar to that shown in WO 88/04841. The electrical data connector assembly is assembled by first stripping a free end of the data cable 230 to expose shielding braid of the data cable 230. A portion of the shielding braid towards the free end thereof is later cut to expose the individual data conductors 235, and are positioned in associated slots

such as 208 and 218 to position each conductor 235 into one of the insulative barrel members 202, and against one of the pegs 204. The stuffer cap 200 can now be aligned with the housing member 4 such that the aligning ribs 225 are positioned in the side slots 23 which aligns the barrel portions 202 with corresponding wire barrel portions 34 of the terminals 30. Pressing down on the stuffer cap positions the individual insulated conductors in the barrel slot 35 shown in Figure 3, thereby electrically connecting the individual conductors to the terminals 30.

The lower shield member 160 can now be positioned around the terminal support housing 4 such that the deformations 172 are positioned in the notched portions 22 in the side walls 18 and such that the clamp 182 surrounds the shielding braid of the shielded data cable. The clamp member 240 can now be slid forwardly to encompass the cable receiving clamp 182 and can be crimped to provide an adequate electrical connection between the lower shield 160 and the shielded braid of the cable. The upper shield part 185 is now assembled to the lower shield part by inserting the front shielding wings 189 (Figure 17) into the housing member 4, below the hood portion 24, such that the wings span the rib 28. As designed, with the plate portions 186 and 190, and the shielding wings 189, at slight angles with respect to each other, as shown in Figure 18, the upper shield portion 185 is sprung into place such that the tabs 187 are positioned into windows 178, and the top shield portion is spring loaded to the lower shield portion 160, while the rear plate 190 is spring loaded against the lower shield member 160.

It should also be noted that as installed, the shielded subassembly shown in Figures 20-22 contains no EMI/RFI "windows", as each hole or aperture created in the lower shield is covered by a tab portion in the upper shield. For example, the aperture 178, (Figure 15) is filled by the tab 187 (Figure 17), and the spaces formed by the tabs 174, are covered by the side tabs 193 (see Figure 21). It should also be noted that the inward deformation at 172 is positioned in the notch at 22, and the aligning tab 188 is situated in the deformation, which as shown in Figure 20, does not increase the width of the overall assembly.

The terminal support platform 4 can now be received through a rear opening of the outer housing 6, until the lower block portion 46 together with the front edge 166 of the shield member 160 abut the rib 70 located adjacent to the front edge of the housing of the outer housing as shown in Figure 5. At the position where the housing 6 is fully received over the terminals housing 4, the side locking lances 174 of the lower shield member 160 are locked in place in the front window 54 of the outer housing member 6.

The installer can now decide whether the cable exit should be straight or angled, and the same cable support member as shown in Figures 10-13 can be used for either orientation. If the user desires a straight exit, the cable support sleeve 10 (Figure 10) is positioned over the exterior of the data cable 230 to a position where the cable sleeve surrounds the cable, (to the configuration shown in either Figure 11 or 13) and the cable support sleeve 10 is positioned within the rear plate such that slot 148 is positioned in recessed slot portions 108,110 (Figure 8). The rear plate is then fully positioned around the cable support sleeve 10 shown in Figure 8 and the rear support plate is pushed forwardly into the position shown in Figure 1 where the latching arms 102 are latched within the windows at 56 in the outer housing portion 6.

If the user desires for an angled wire exit, the cable support member 10 is installed in the same manner as described above, except that the slot 150 (Figure 12) is positioned between the recessed slots between 108 and 110 of the rear support member 8 and the rear support member is rotated by an angle of 180°, to the position shown in Figure 2. Thus, as shown in the configuration of Figure 2, the surfaces 135 and 136 (Figure 10) form a relief angle around which the cable can bend. Thus as described in the above mentioned embodiment, the outer housing 6 can advantageously be slidably received over the shielded sub-assembly after the termination of the conductors and after installation of the shield assembly 12. This is due to the fact that the rear support plate 8 and the cable support member 10 are bipartite in nature and can surround the cable after the cable is installed to the housing 4. Also advantageously the rear cable sleeve 10 can provide for both straight through and angled cable exit without adding a redundant part to the connector assembly. Also advantageously the stuffer cap has plate portions which are generally directed towards a longitudinal axis of the connector assembly therefore the cable twist can extend closer to the electrical terminals thereby providing better cross talk characteristics to the connector assembly.

With reference now to Figures 24 and 25, a second embodiment of the connector is shown at 300 having a modified rear support plate 308 and a modified cable support sleeve 310. The support plate 308 is similar to the previous support plate 8 having legs 312 and posts 314 interconnecting the two legs 312 on each side. It should be appreciated that the rear support plate is also shorter in the longitudinal distance due to the modified cable sleeve 310. The cable support plate 308 also has two angled surfaces 316 and 318 for receiving the cable support sleeve 310.

The cable support sleeve 310 comprises bi-partite halves as the previous sleeve, but is substantially shorter. The sleeve 310 includes intersecting slots 320 and 322 which fit within edges in the bipartite halves as before. The sleeve 310 further comprises front surfaces 324 and 326, and rear surfaces 328 and 330, as shown in Figure 25. Finally, the sleeve includes inner circumferential surfaces 332, 334 and 336.

If the user desires an angled out wire as shown in Figure 24, the rear plate is positioned as shown, and the slot 320 is positioned in the edges of the bipartite cable

shell halves, with surface 334 and 336 directing the wire outwardly at an angle. If the user desires a straight through cable exit, then the rear support plate 308 is rotated to the position shown in Figure 35, and the cable support sleeve 310 is rotated clockwise (as viewed in Figure 25) to position slot 322 in the rear support plate 310, with surface 326 facing the shield clamp, and with inner surfaces 334 and 336 directing the wire straight out.

A further embodiment yet is shown yet in Figures 26-35. Figure 26 shows a rear support plate 410, having an opening 412 and latches 414. A cable support sleeve is shown in Figures 30-33 as 420 having bipartite halves 422 with a groove 424. The cable sleeve 420 can be folded around and slid into the open end 412, and the plate 410 can be snap latched into place within the housing as shown in Figures 34 and 35. It should be understood, that in this embodiment, the openings 56 in the outer housing 6, are somewhat modified, to accept the latches 414.

As shown in Figures 34 and 35, the cable clamp 420 can be flipped end for end, to provide two cable exit orientations. As shown in Figure 34 the arcuate portion 430 is shown extending out of the housing, which provides for an angled cable exit. As shown in Figure 35, the cable clamp 420 is flipped end for end to position the arcuate portion inside the housing, and the cable exits in a straight manner.

With reference now to Figures 39 and 40 a rear support plate is formed from two halves shown as 508 including frame support members 511 and 512 where the frame support member 511 includes a peg 513 and the support member 512 includes a complementary hole 514 for the peg 513. It should be appreciated that these support members 508 are profiled such that two identical support members 508 can be connected together, as shown in Figure 40. Side plates 515 extend forwardly from the support members 511 and 512, and provide a latching arm 518 having an outwardly extending latching lug 519.

With reference now to Figures 36-38, the cable support sleeve is shown generally at 510 including complementary halves 525 and 526 integrally moulded together by way of a web of material 527 as shown in Figure 38. Each of the halves include flexible inner fingers at 528 for compressibly gripping the cable to hold the cable from axial strain. The outer surfaces of the strain relief member includes two slots at 521 and 522 which cooperate with the support members 511 and 512 to project the opening 530 in alternate directions.

As shown in Figure 40, the sleeve is positioned for a straight through cable exit, with surface 531 of the assembled sleeve 510 positioned against recess 516 of one of the rear support members 508. Alternatively, the sleeve 510 can be pivoted such that slot 522 aligns with the support members 511, 512 with surface 532 positioned in the recess 516b. It should be appreciated that, as shown in Figure 38, the distance between surfaces 532 and 534, is equal to the distance between surfaces 531 and 533, which is equal to the distance between inner surfaces 520, when the rear plate halves 508 are assembled. Alternatively, the cable support sleeve 510 can be rotated by 180°, relative to the longitudinal axis, and positioned with surface 532 against the recess 516a.

Thus, all of the above mentioned embodiments provide a low cost data connector having more than one cable orientation, and advantageously do not require redundant parts to accomplish this objective. Furthermore, as described above, the cable support sleeve and rear support plate can be assembled to the connector assembly after termination of the conductors.

Claims

1. An electrical data connector (2) for electrical connection to data cable (230), comprising a plurality of electrical terminals (30) positioned in an insulating housing means (4,6,8,308,410,508) said housing means having at least one cable exit opening therethrough, and a cable support sleeve (10,310,420,510) fixable to said housing and within said opening for retaining said data cable, said connector (2) being characterized in that said cable support sleeve (10,310,420,510) can be fixed in said cable exit opening in a plurality of orientations, thereby providing a plurality of cable exiting directions.

2. A connector (2) as claimed in claim 1, characterized in that said housing includes a rear support plate (8,308,410,508) releasably fixable to said housing means, where said opening is positioned in said rearplate.

3. A connector (2) as claimed in claim 2, characterized in that said rear support plate (8,308.410,508) can be assembled to said housing, over the cable 230.

4. A connector (2) as claimed in claim 2 or 3, characterized in that said rear support plate (8,308,410,508) has support edges spanning said opening, and said cable support member has a plurality of grooves (148,150; 320,322; 424; 521,522) which are gripped by said edges, to hold said cable support sleeve in a plurality of orientations.

5. A connector (2) as claimed in any one of the preceding claims, characterized in that said cable support sleeve (10,310,420,510) has a cable exit opening which, when rotated into various orientations, moves said cable into various exit directions.

6. A connector (2) as claimed in any one of the preceding claims, characterized in that said cable support sleeve (310,420) has inner surfaces (332,334,336) for directing said cable outwardly in either an angled or a straight direction.

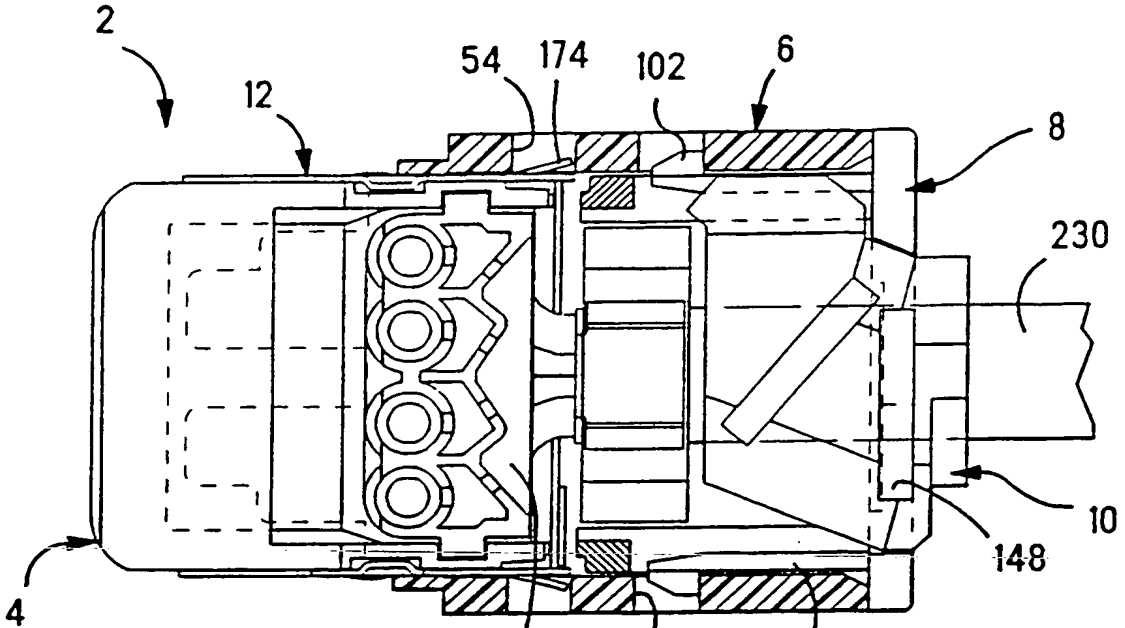


FIG. 1

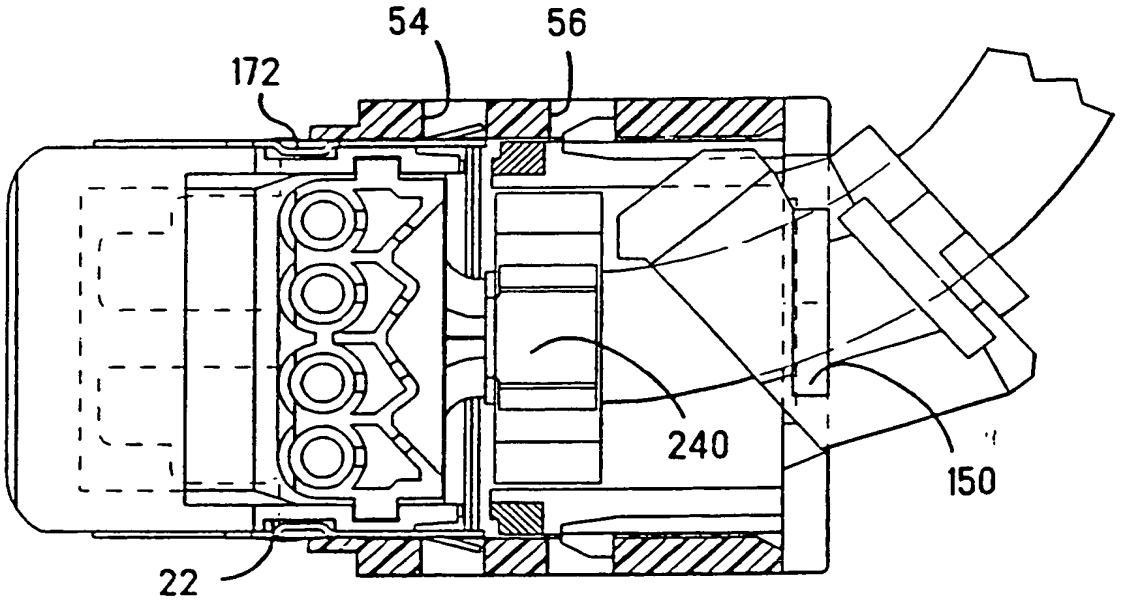


FIG 2

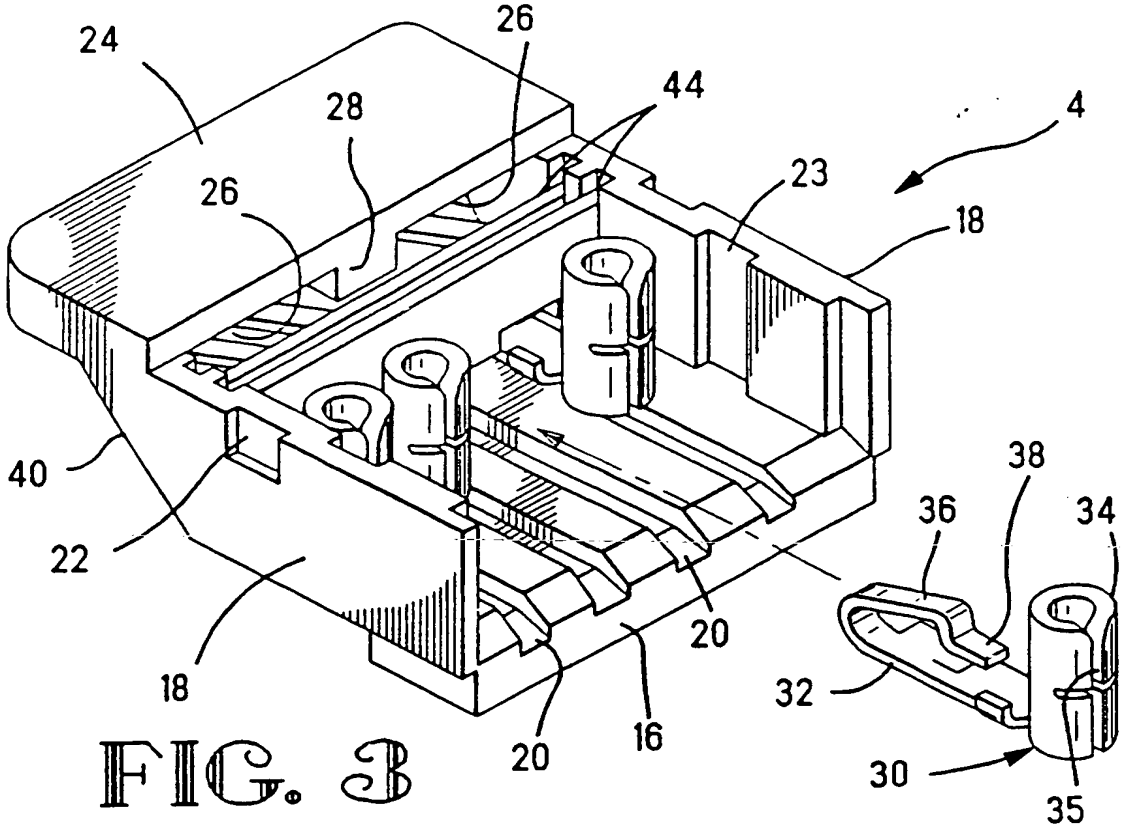


FIG. 3

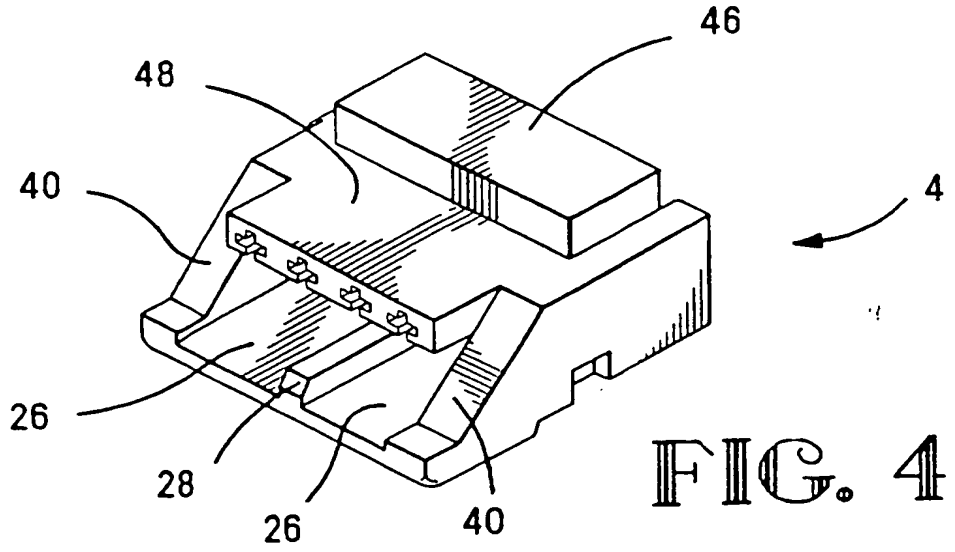


FIG. 4

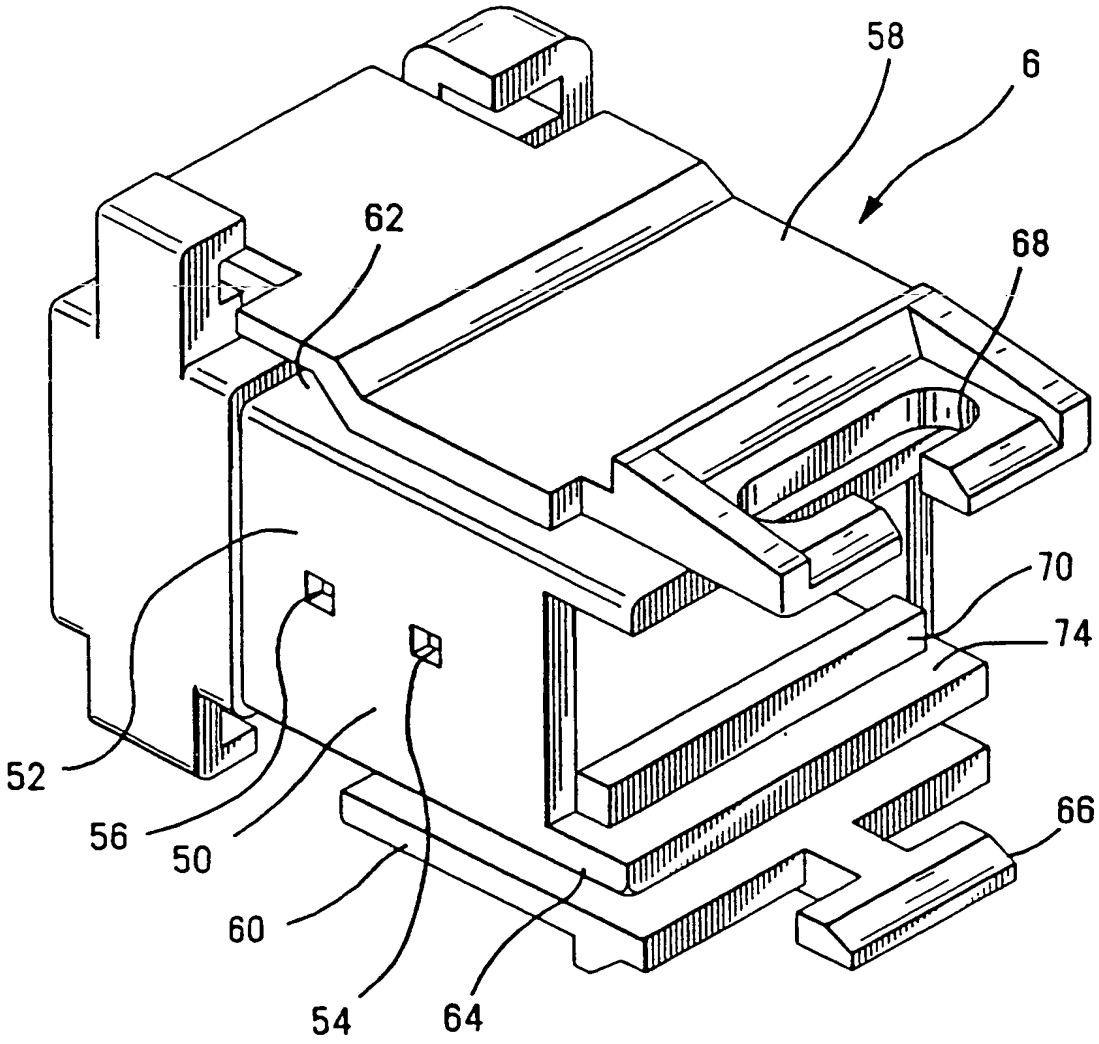


FIG. 5

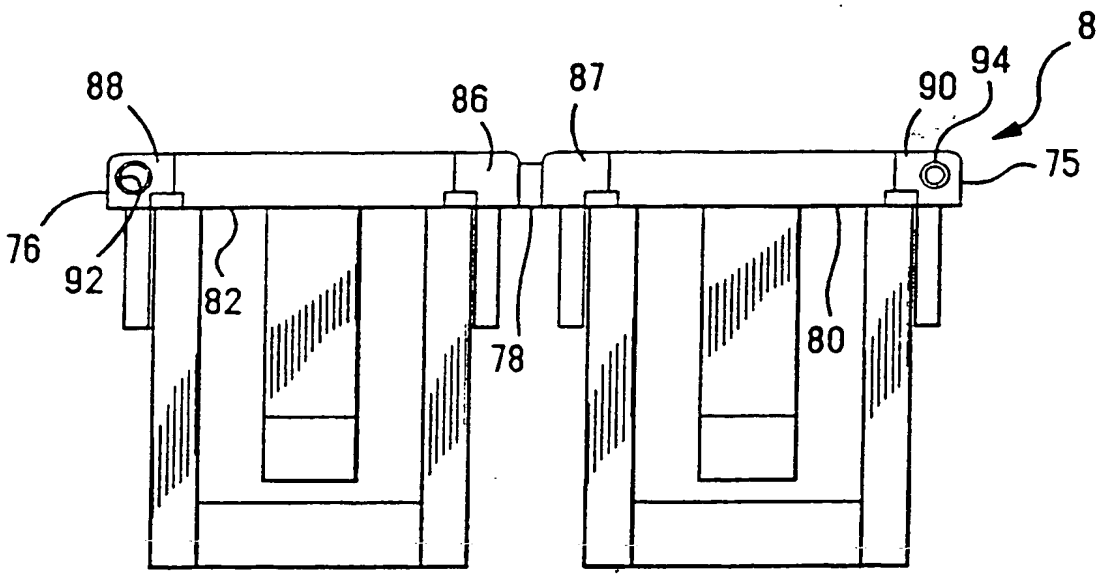


FIG. 6

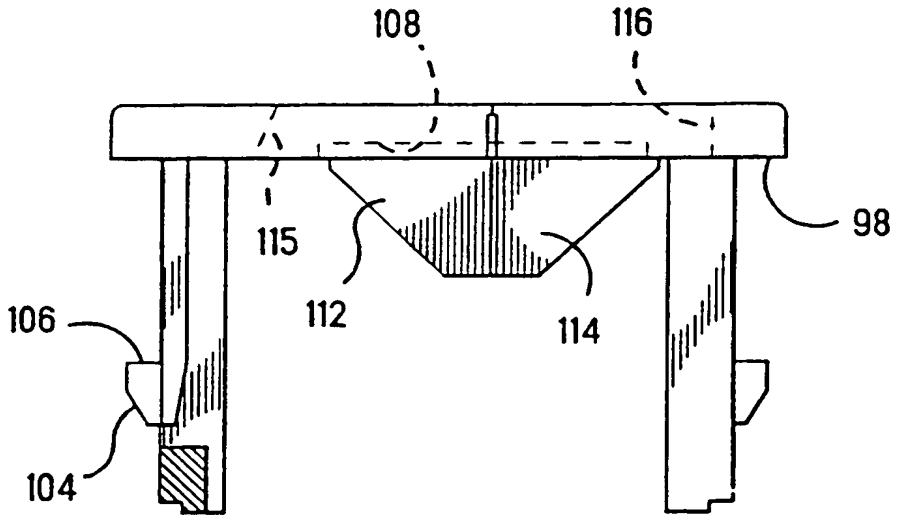
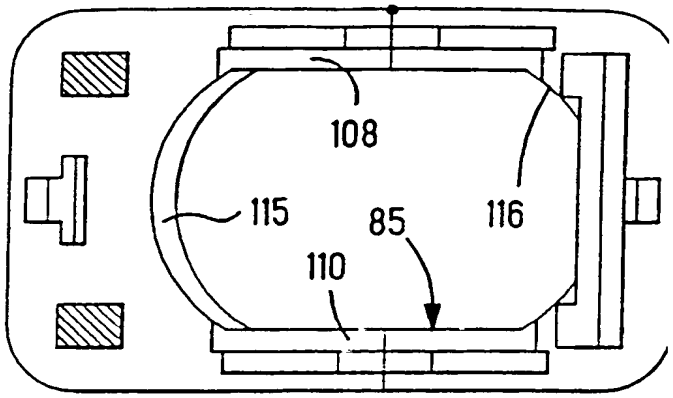


FIG 7

FIG. 8



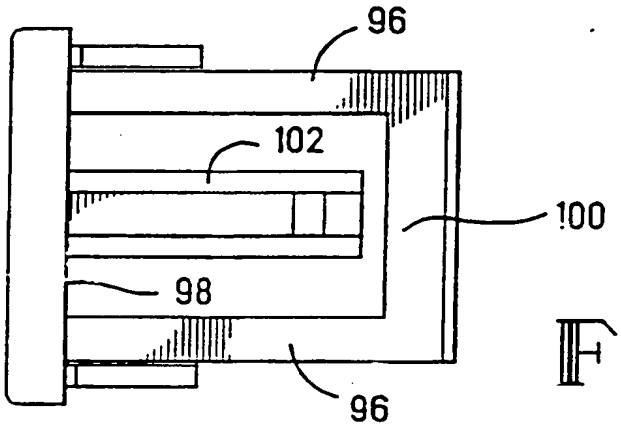


FIG. 9

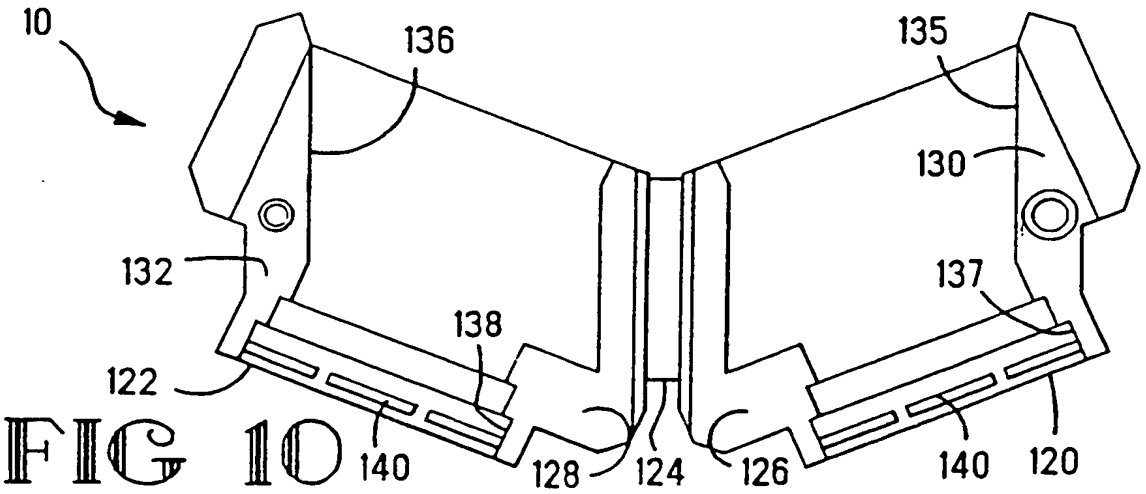


FIG 10

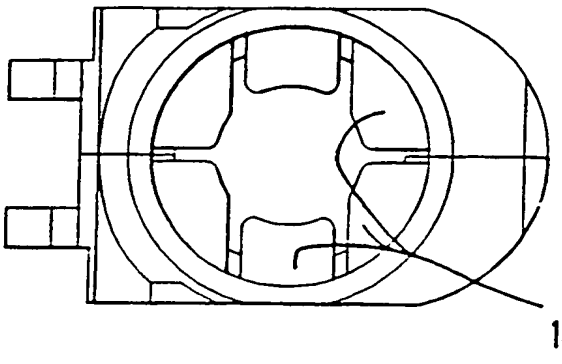


FIG. 11

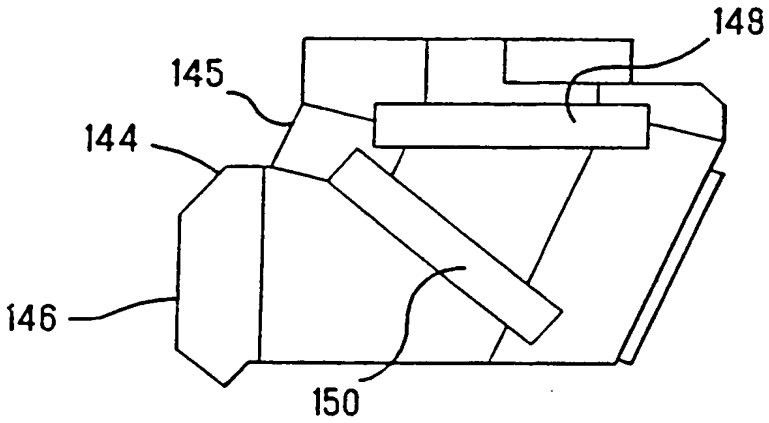


FIG. 12

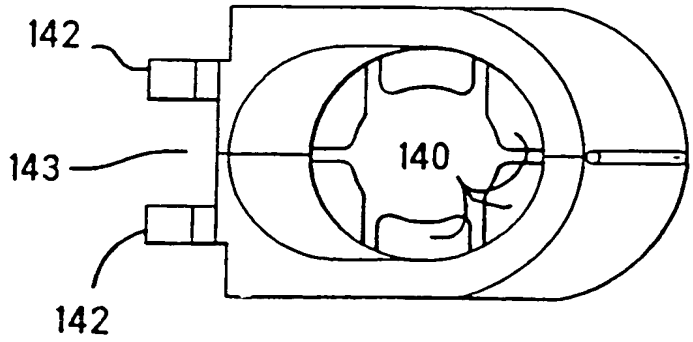


FIG 13

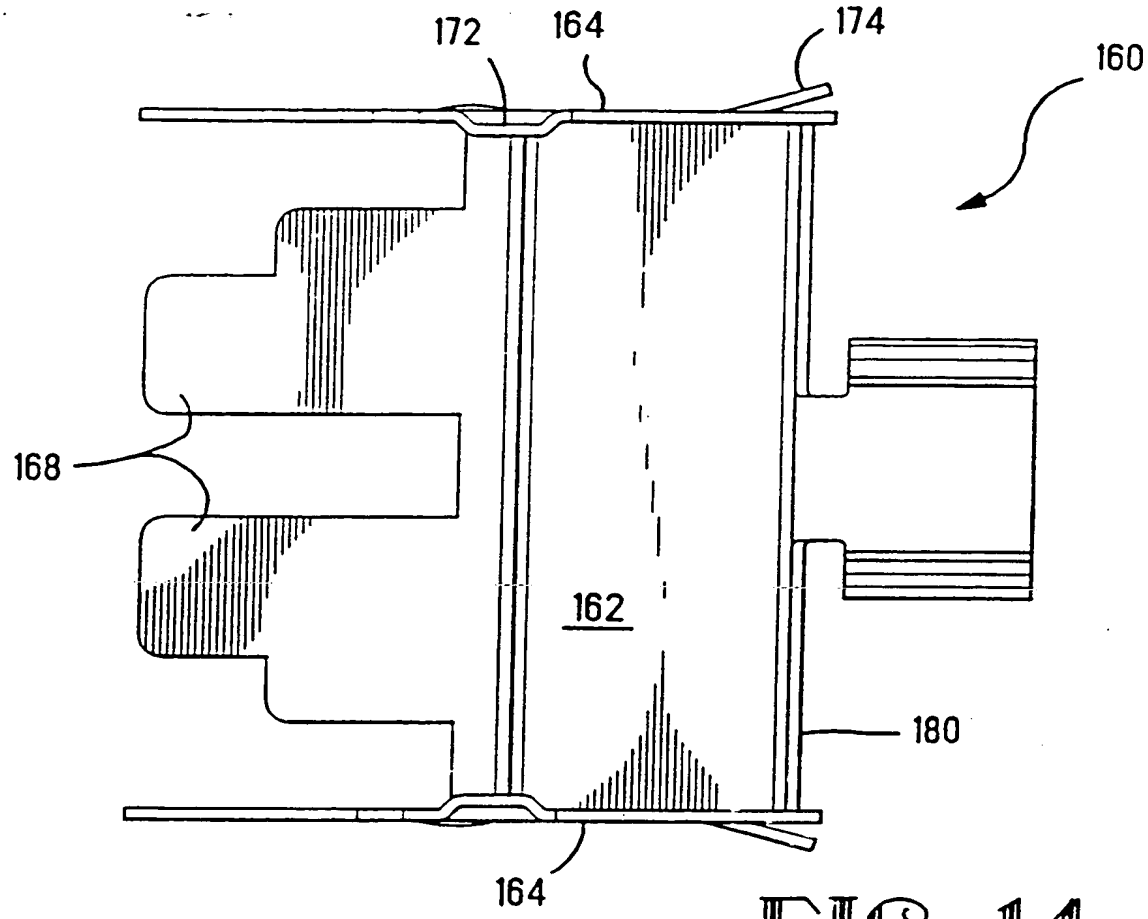


FIG. 14

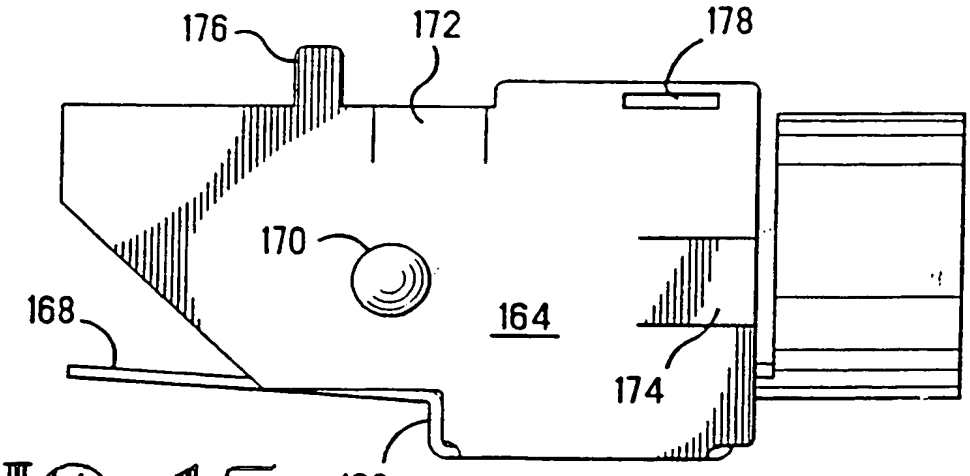


FIG 15

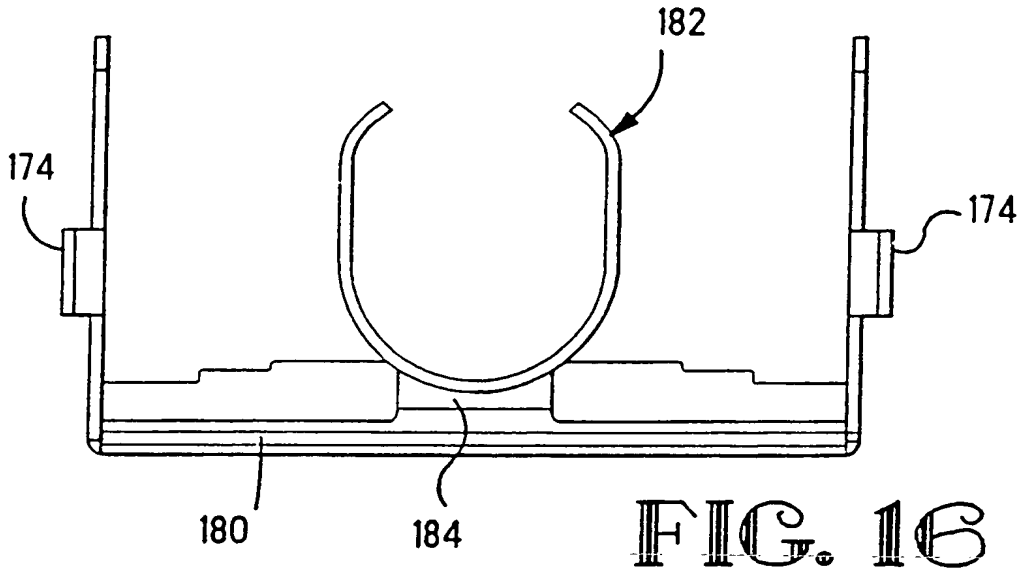


FIG. 16

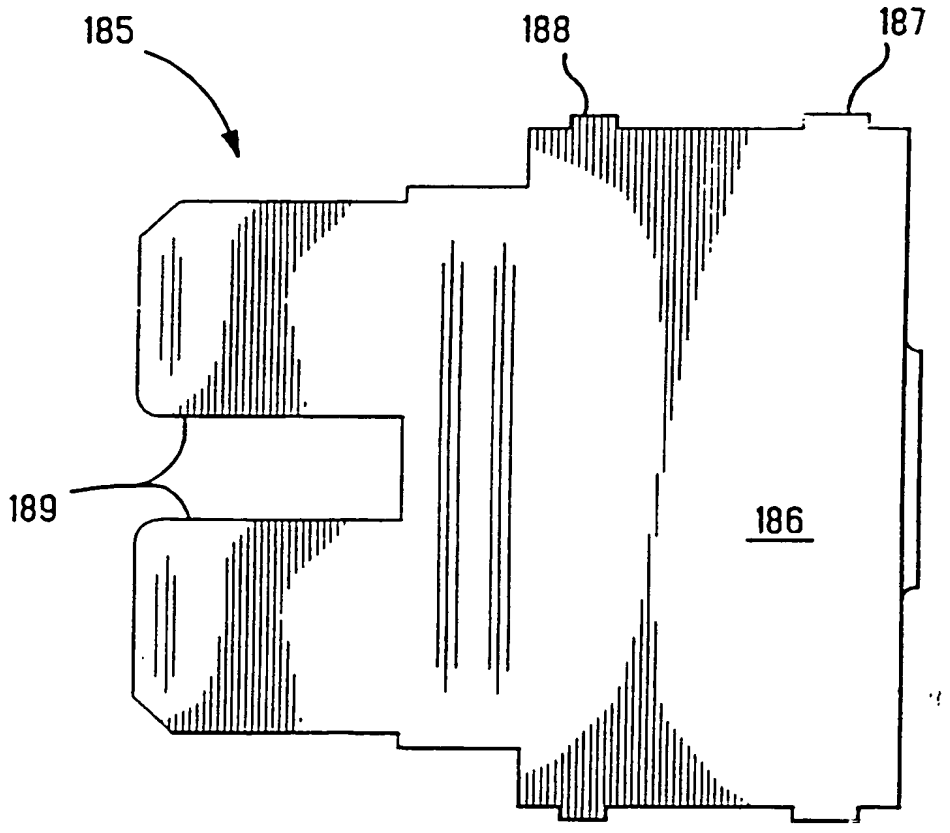


FIG. 17

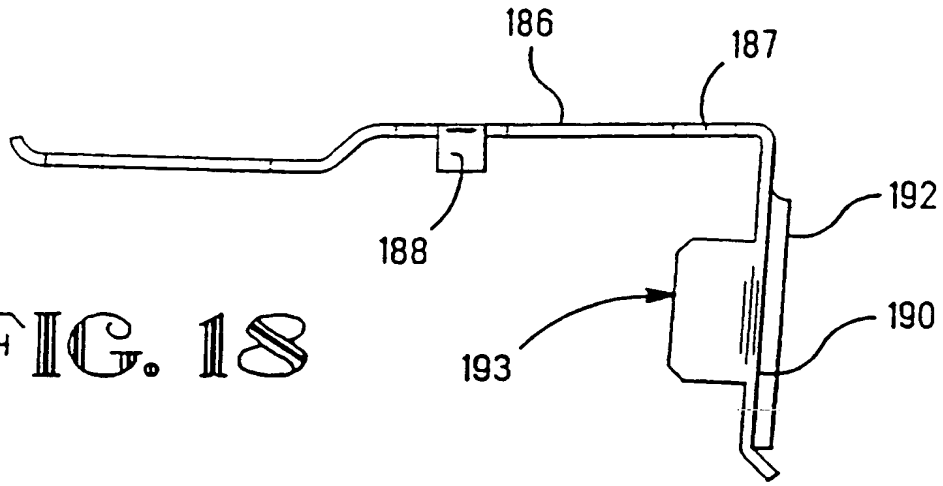


FIG. 18

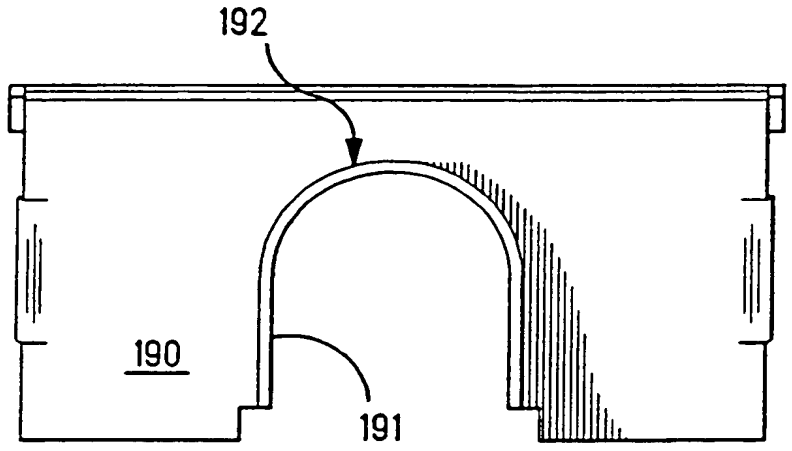


FIG. 19

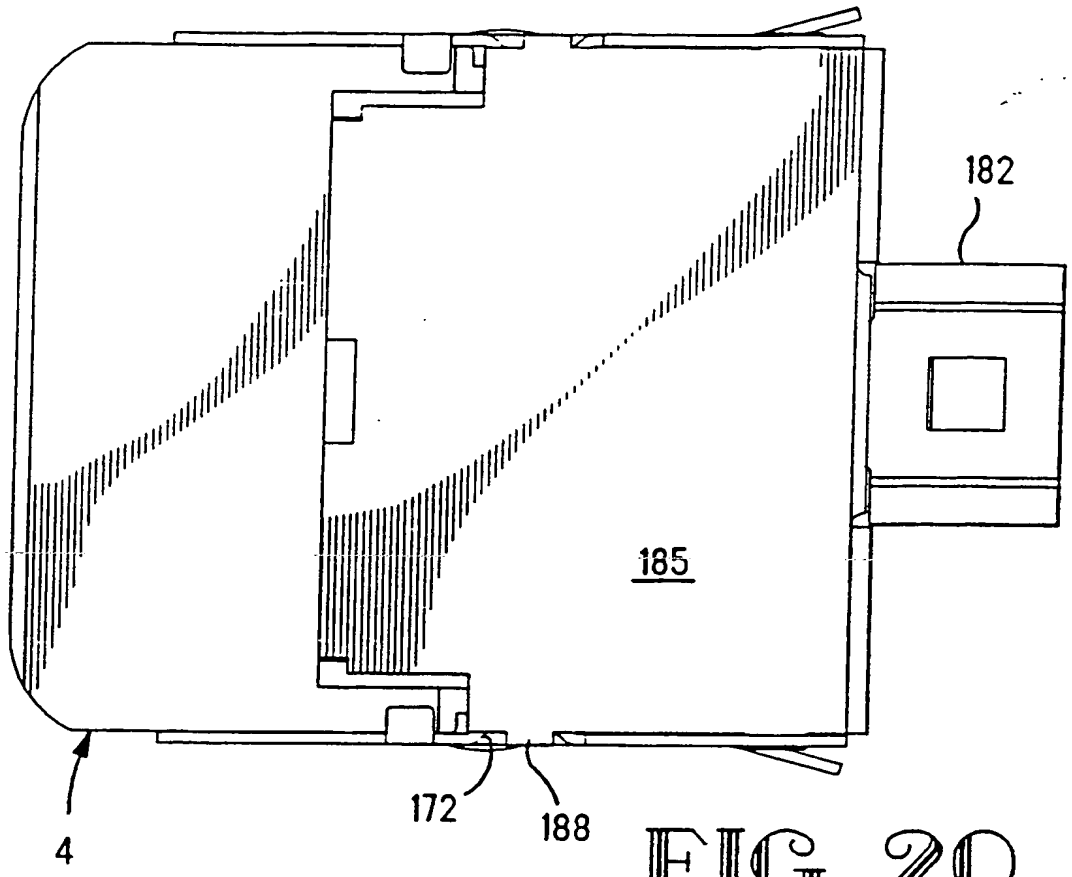


FIG. 20

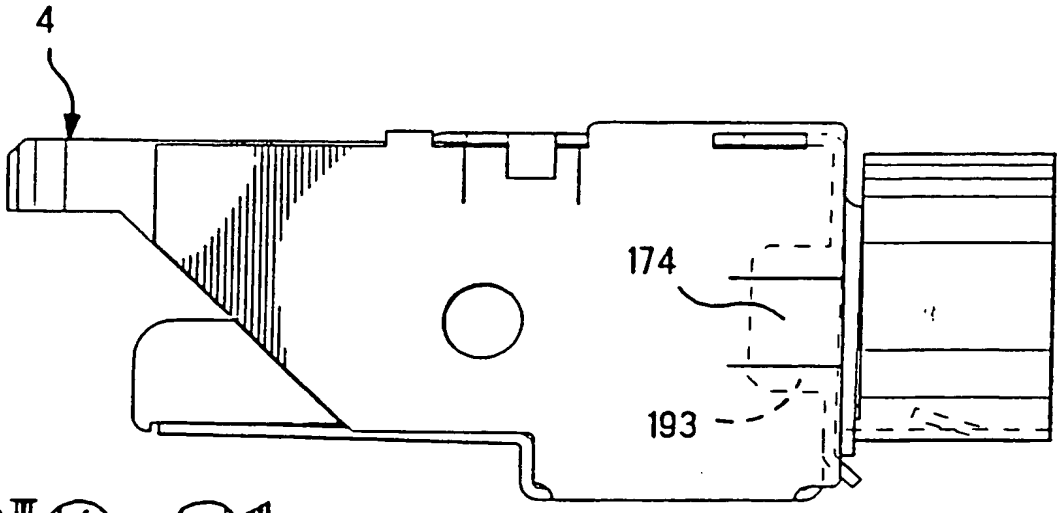


FIG. 21

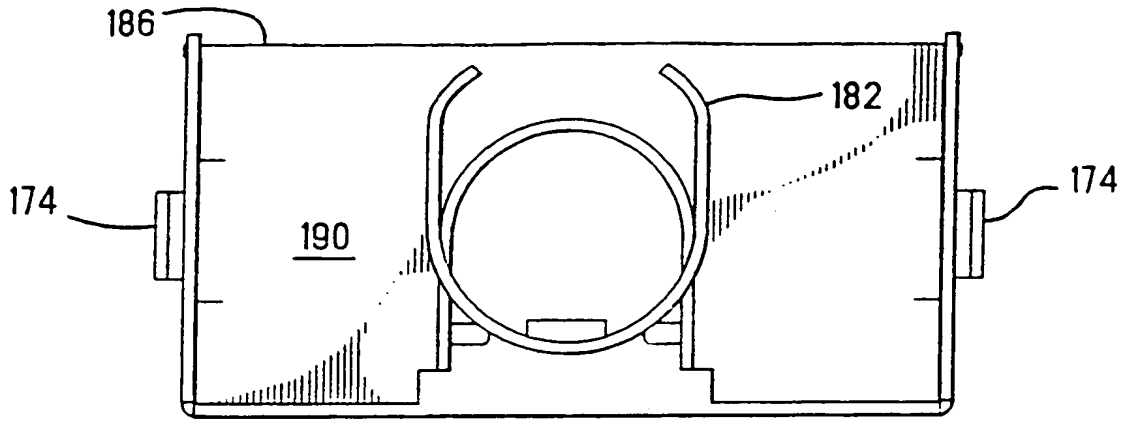


FIG. 22

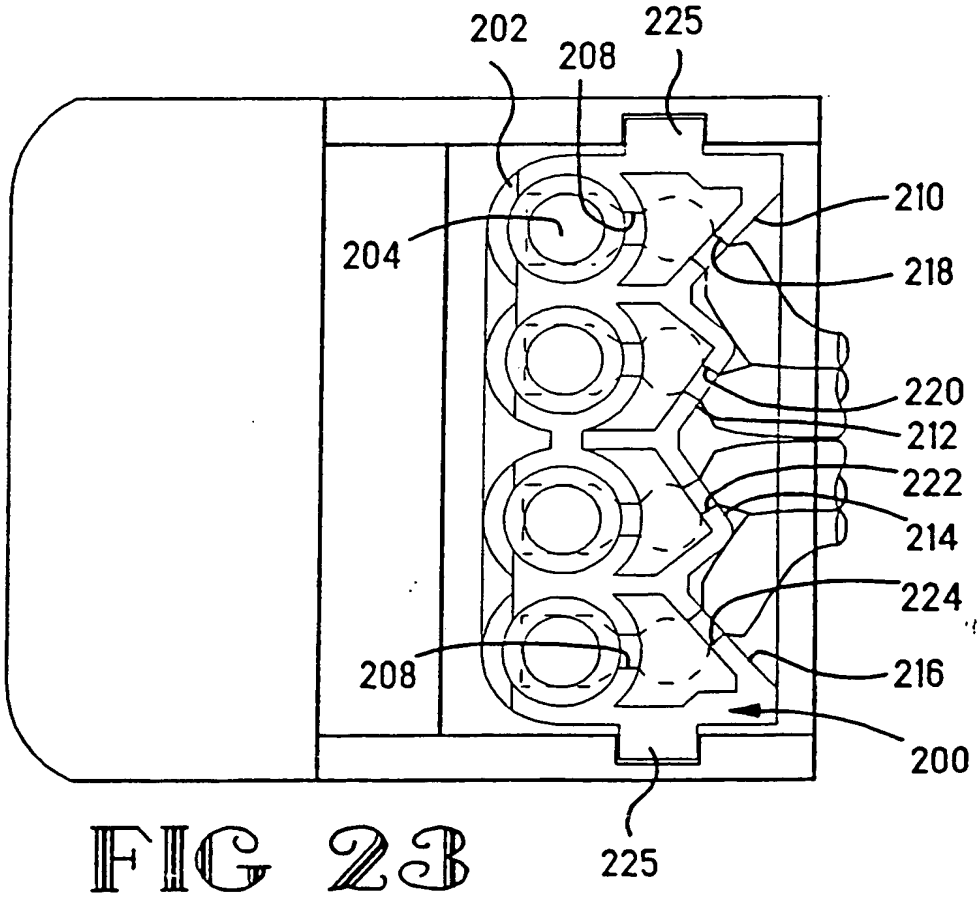


FIG 23

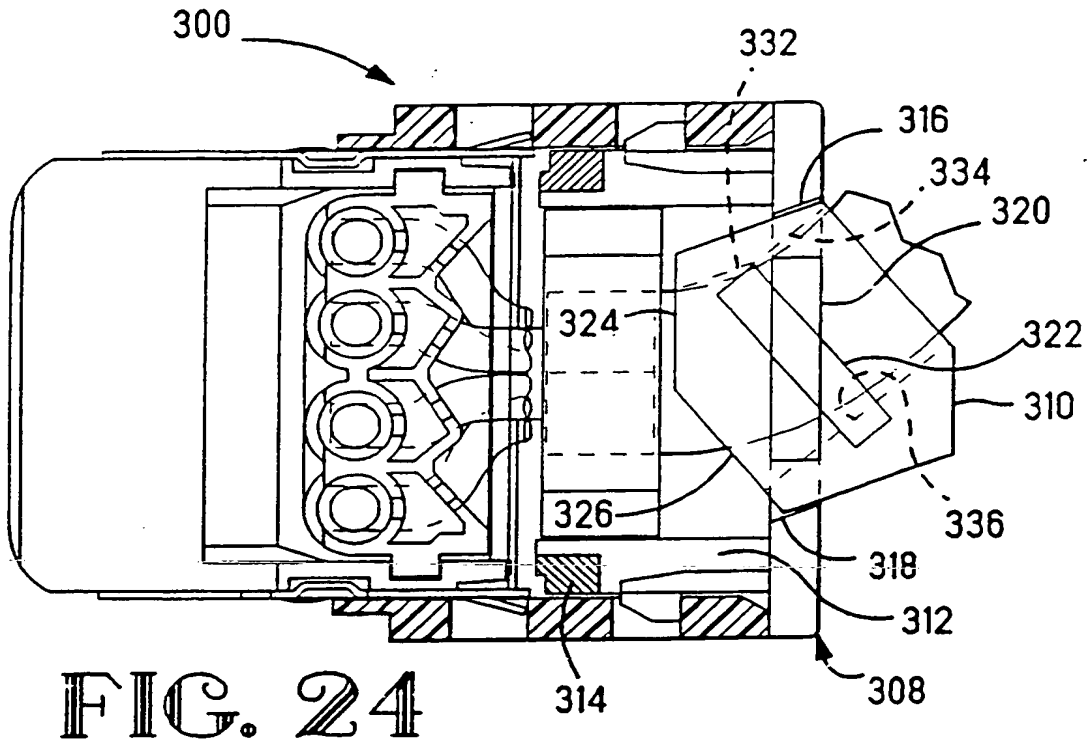


FIG. 24

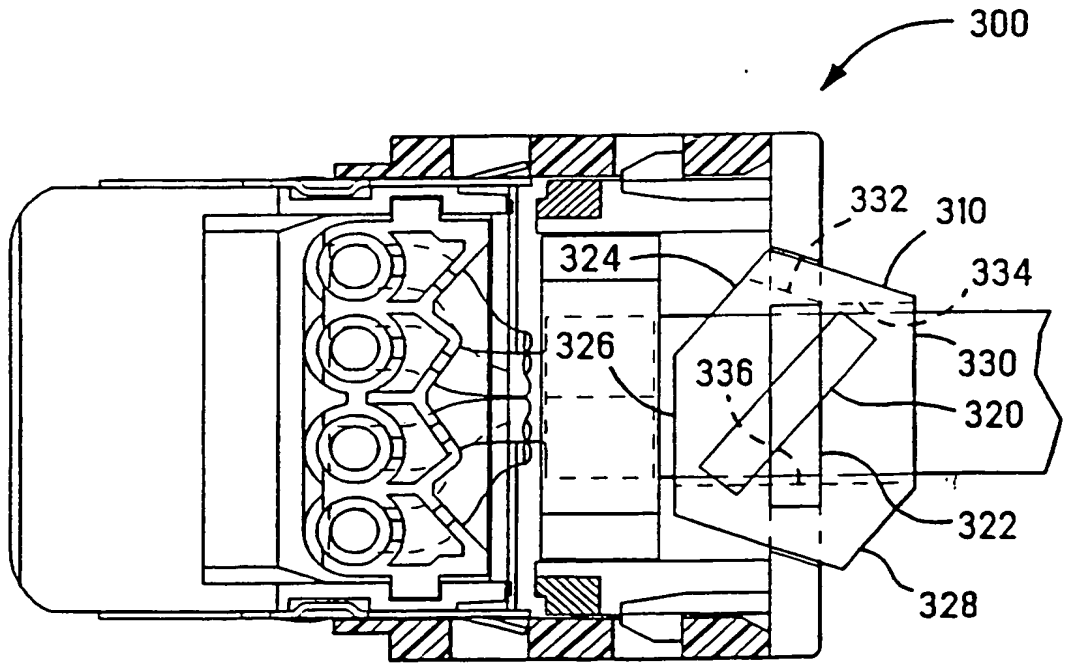


FIG. 25

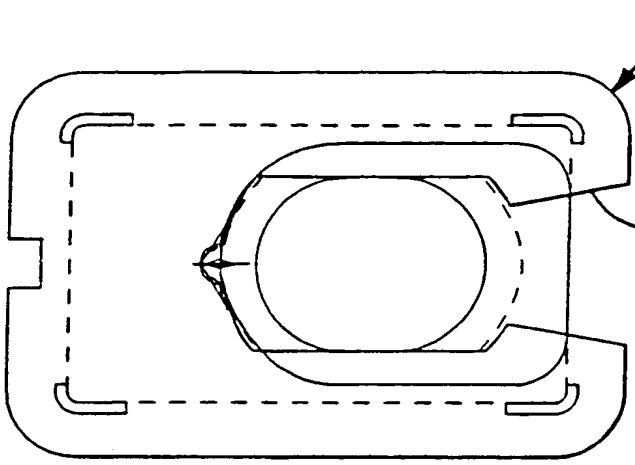


FIG. 26

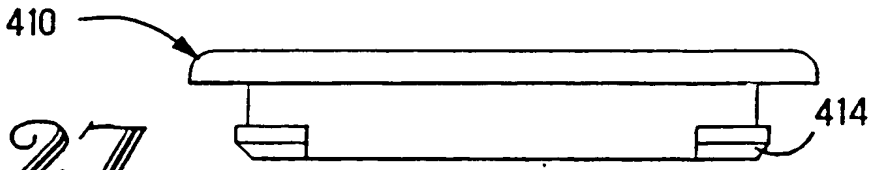


FIG. 27

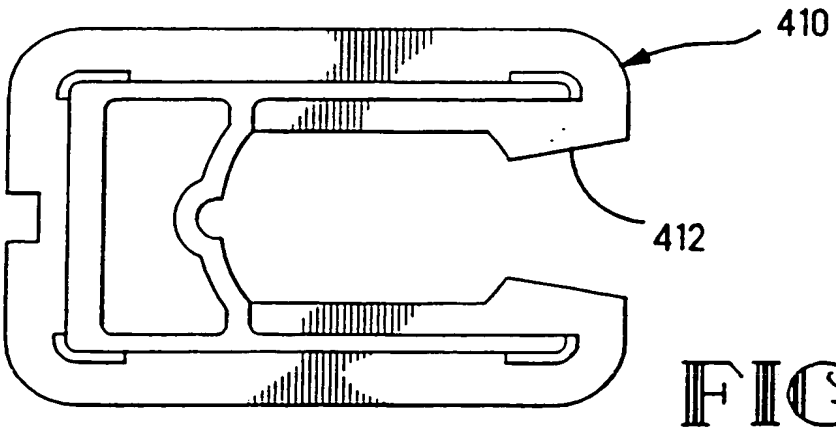


FIG 28

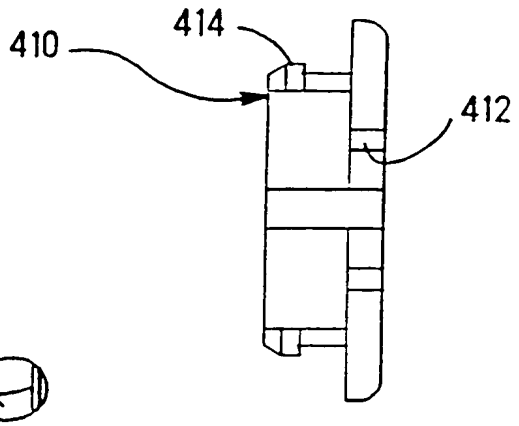


FIG. 29

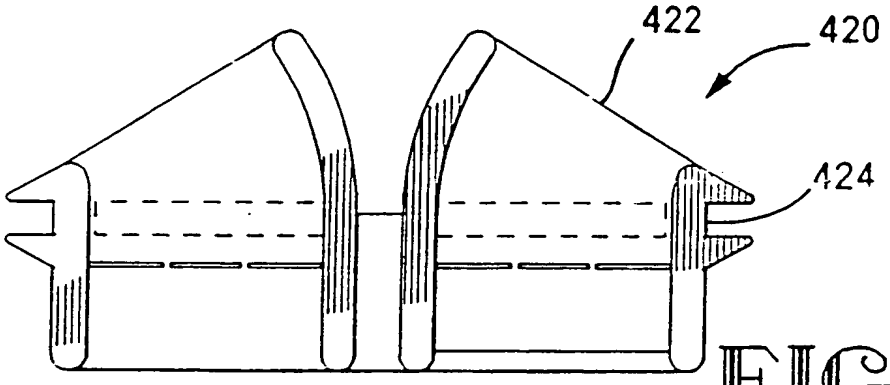


FIG. 30

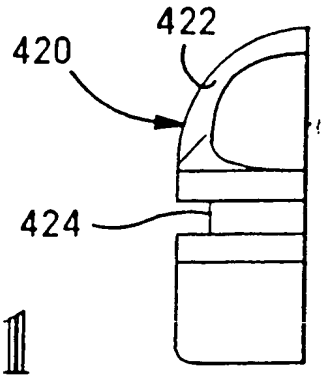


FIG. 31

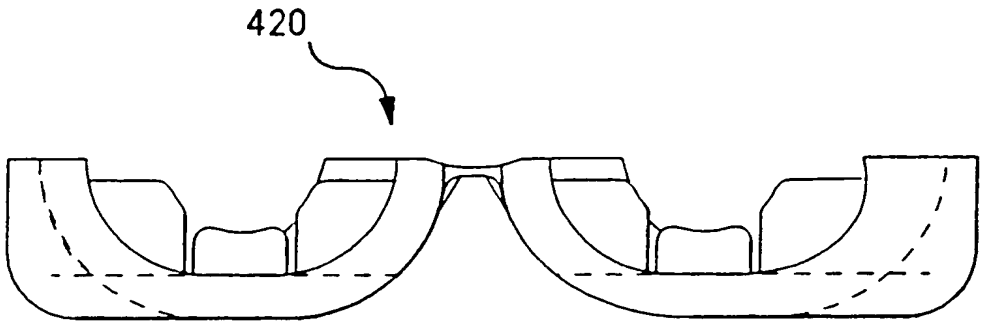


FIG. 32

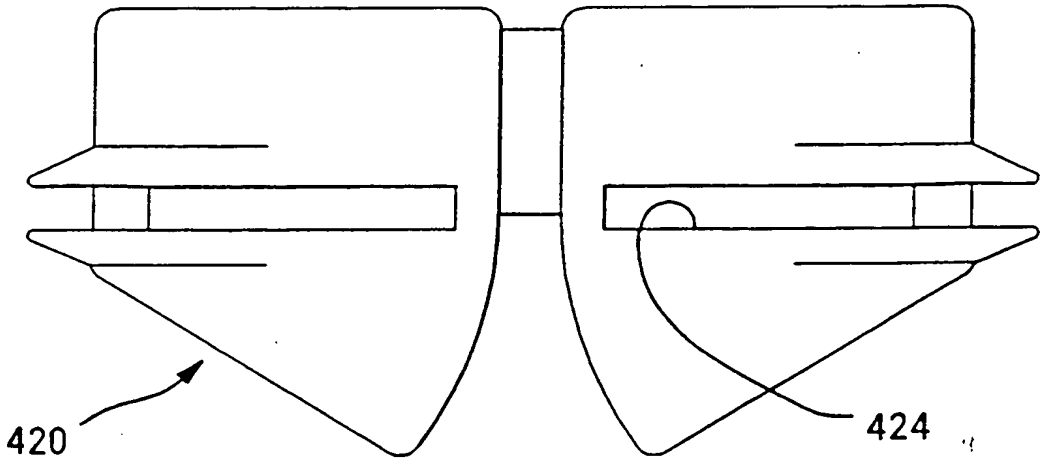


FIG 33

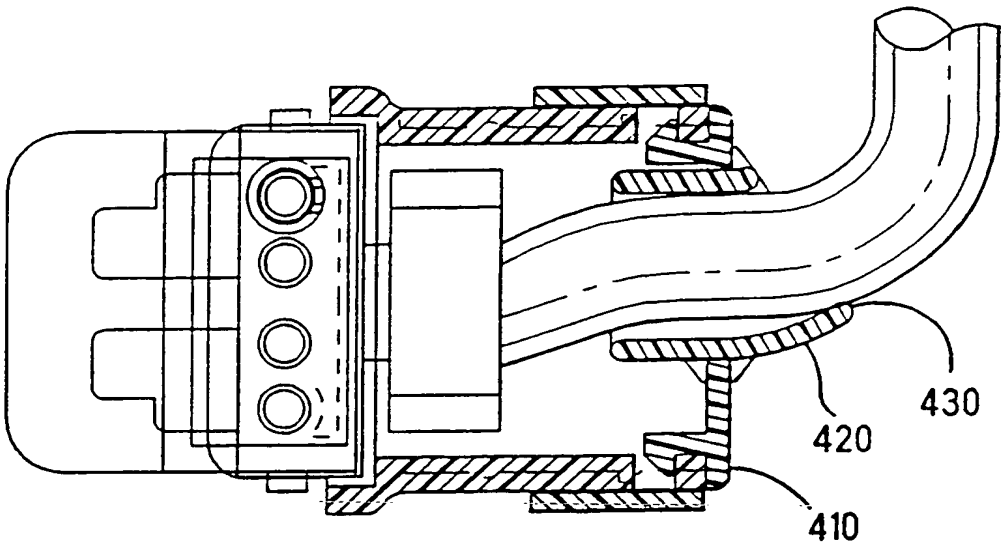


FIG. 34

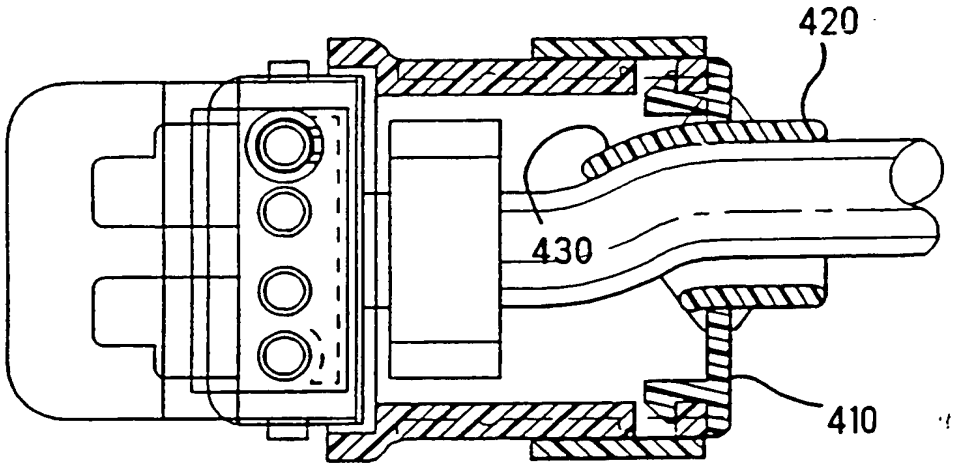


FIG. 35

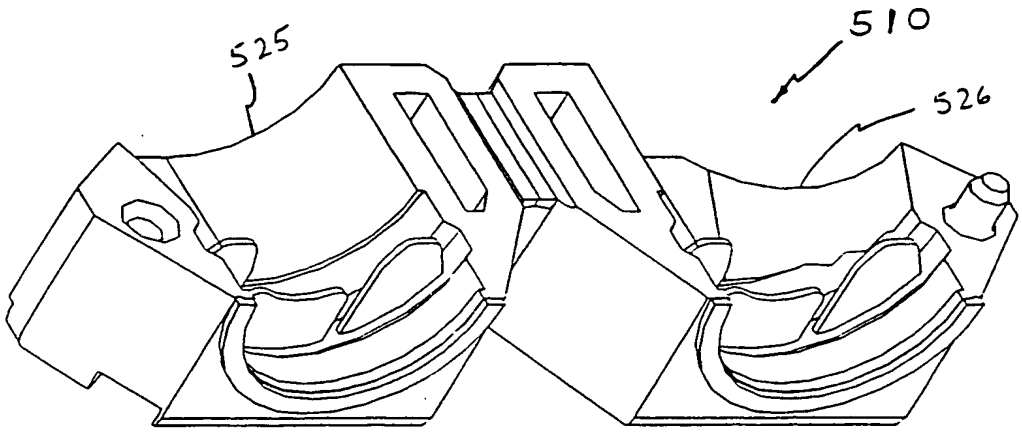


FIG 36

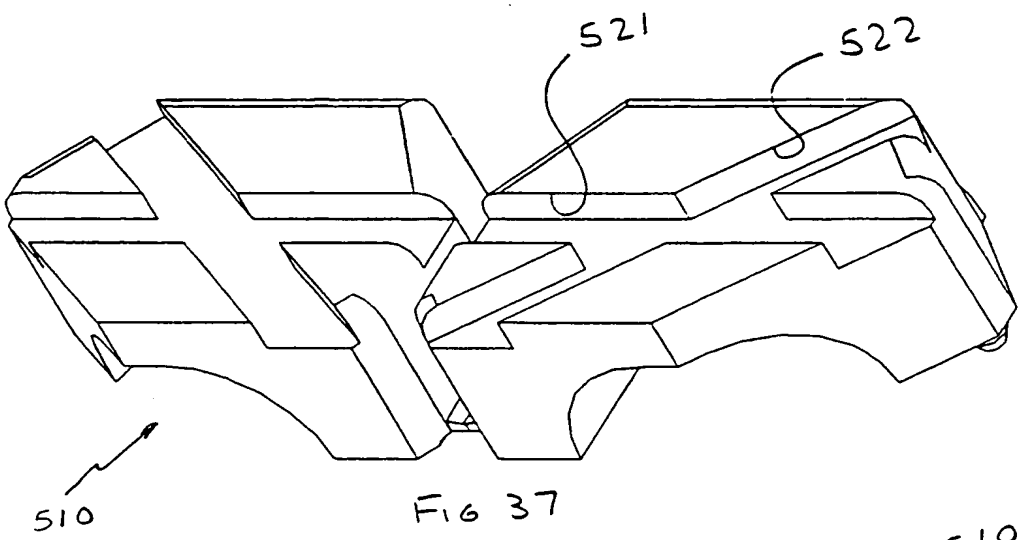


FIG 37

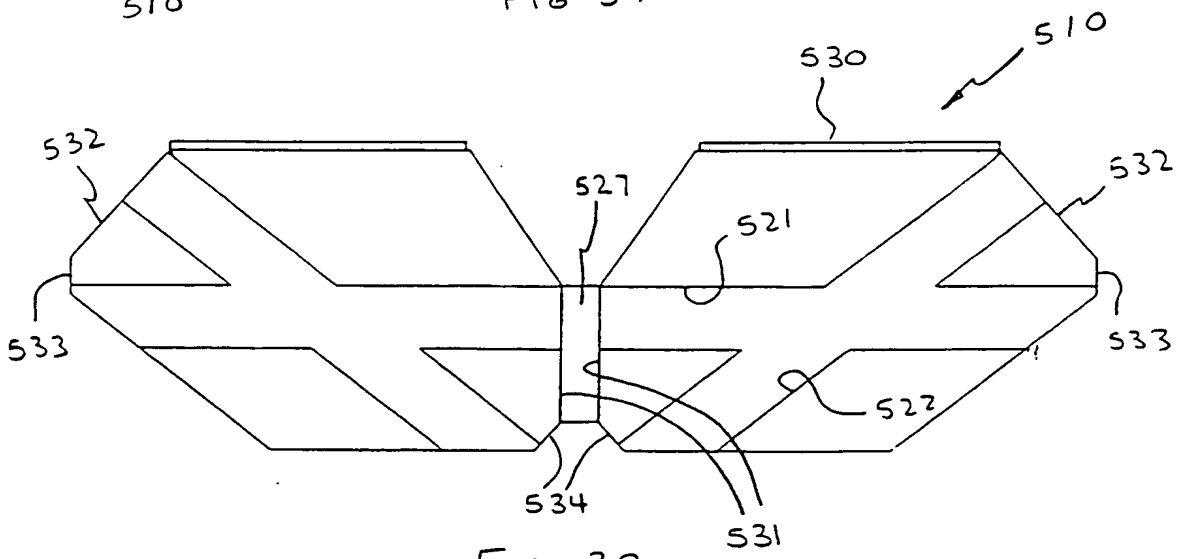


FIG 38

FIGURE 39

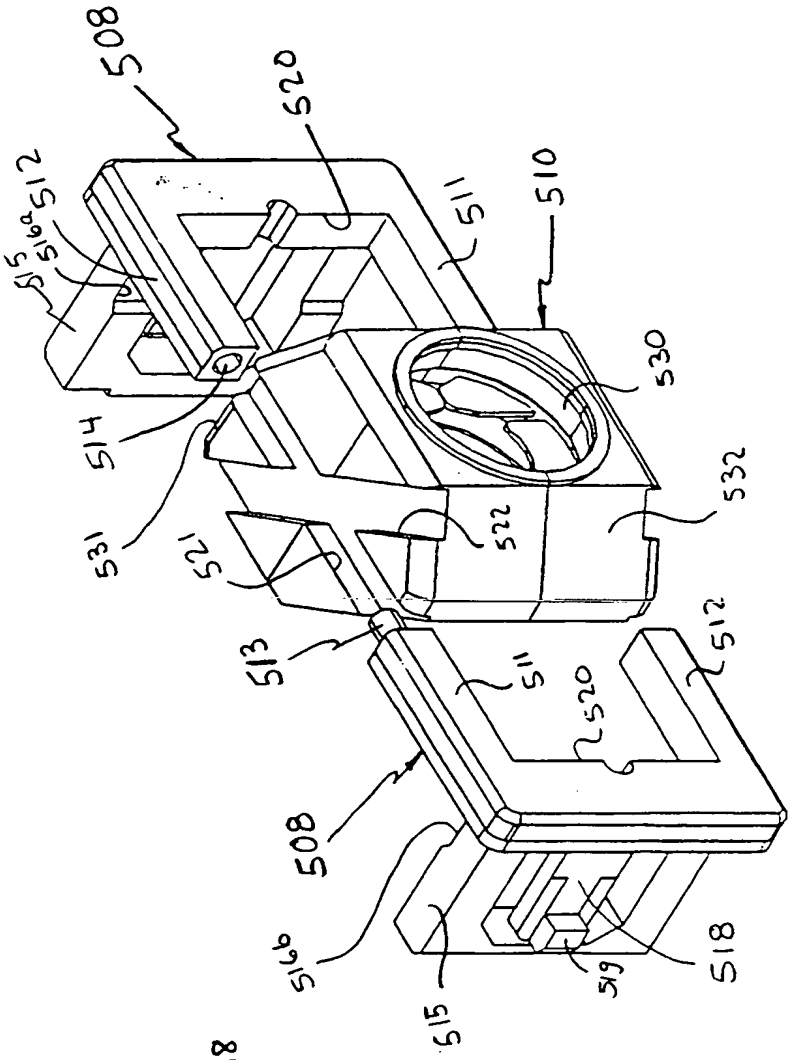
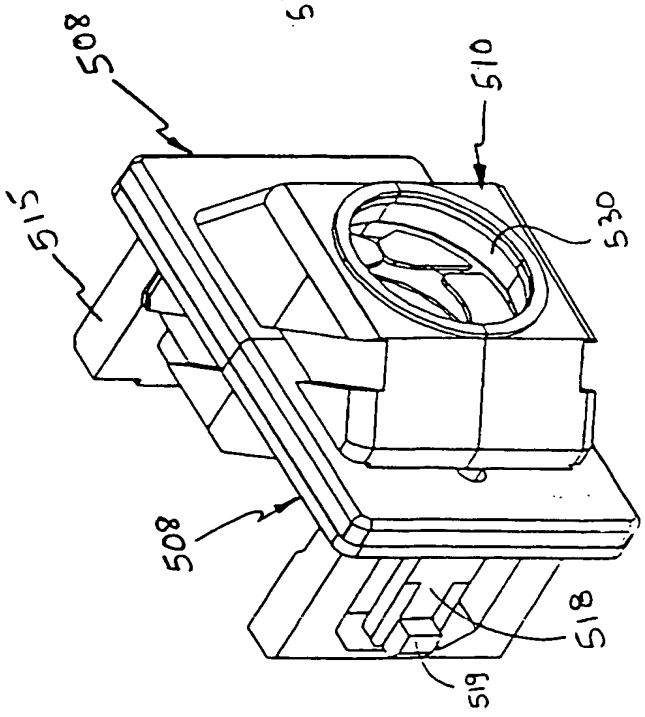


FIG 40



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(54) Data connector

(57) An electrical data connector includes a terminal support housing (4) carrying a plurality of electrical terminals (30). The housing (4) has at least one cable exit and a cable clamp (10) fixable to the housing (4), in the cable exit. The cable clamp (10) can be positioned in a plurality of orientations to provide a plurality of cable exit directions.

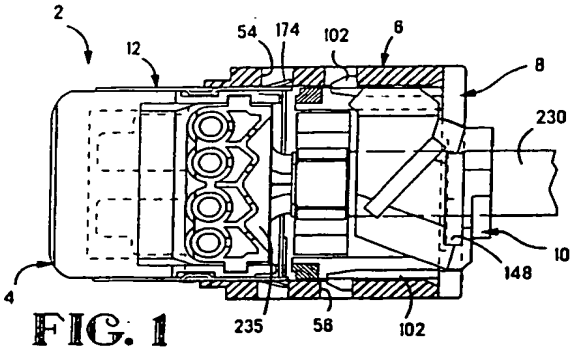

FIG. 1

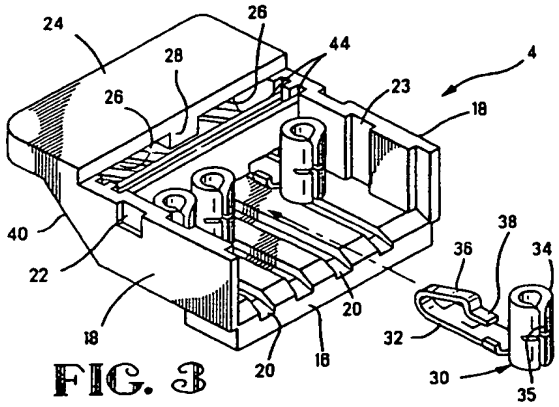

FIG. 3

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European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 20 2067

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US-A-3 995 947 (LIGHTNER LINN STEPHEN ET AL) 7 December 1976 * column 3, line 30 - line 51; figures 1,12-14 *	1,2	H01R13/58
A	US-A-4 857 674 (FILBERT JACQUES) 15 August 1989		
A	DE-A-29 20 266 (NAT RES DEV) 6 December 1979		
A	US-A-4 629 276 (GENARO DONALD M ET AL) 16 December 1986		

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

H01R

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	16 December 1996	Horak, A

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